

ABSTRACT OF THE INVENTION

Provided are optical amplifiers and method for amplifying an optical signal with an improved noise figure. This is achieved by exploiting the coherence (data) and incoherence of an optical. More specifically, an optical signal is split into two path signals that propagate and are amplified along two independent paths. The path signals each carry a signal path component and an external noise path component. After amplification the path signal each further carry an ASE (amplified spontaneous emission) path component wherein the ASE path components are un-correlated. While the ASE components are combined, at a combination point, such that the ASE power is substantially divided between a main output and one or more subsidiary outputs, an optical path length difference between the two paths is properly tuned such that the signal path components are combined constructively at the main output and experience maximal output and such that at least a portion of external noise power is diverted to the one or more subsidiary outputs.